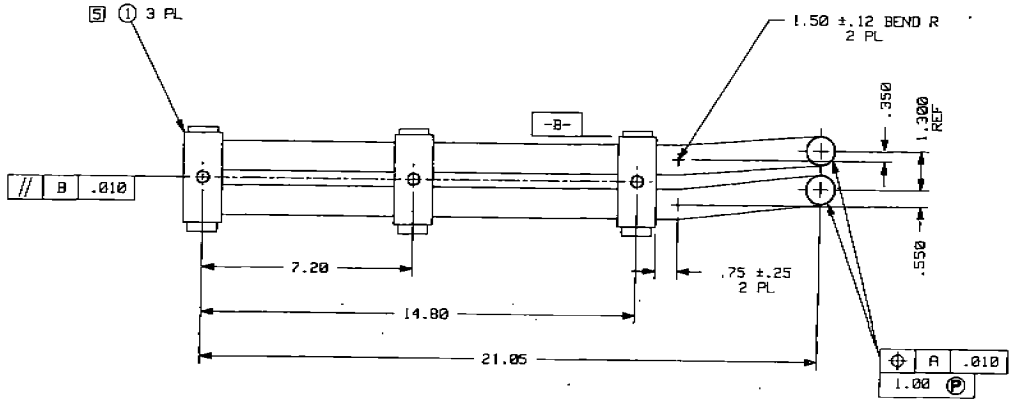
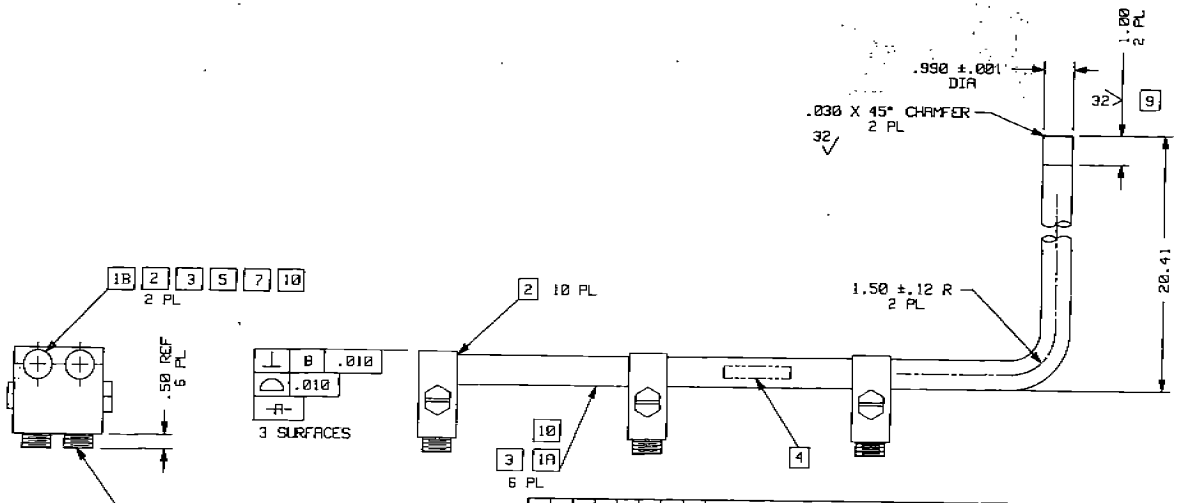
APPROVED	SUGGESTED SOURCE(S) OF SUPPLY			
VENDOR	VENDOR ADDRESS	FSCM NO.	VENDOR CAT. OR PN	

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	REDRAWN BY NAVSEC CRANE WITHOUT CHANGE	6/7/91	D. GLINDER
C	INCORPORATE NOR 5942132C	7/30/91	D. Glinder

10 MACHINE TUBES AND PLUGS AS REQUIRED TO ACHIEVE BRAZE CLEARANCE AS SPECIFIED IN NOTE 2.





NOTES

1 MATL: A. SST TUBING TYPE 321 PER ASTM SPEC A-269, 1.000 O.D. X .049 WALL.
B. VALVE PLUGS- SST BAR TYPE 304, COND A PER FED SPEC QQ-S-73.

2 VACUUM BRAZE PER MIL-B-7883, TYPE II EXCEPT VACUUM CHAMBER SHALL BE EVACUATED TO AN ABSOLUTE PRESSURE NOT GREATER THAN .013 PA(1 X 10⁻⁴ TORR) DURING BRAZING. USE BRAZING ALLOY BAG 19 OR AMS4777. ALL BRAZED JOINTS MUST HAVE .001 TO .003 CLEARANCE. AREA INCLUDED BETWEEN OUTER AND INNER EDGES OF THE FAYING AREA FOR EACH LINEAR INCH OF OUTER EDGE MUST BE COVERED A MINIMUM OF 85%. ANY SINGLE DEFECTIVE AREA, LINEAR OR AGGREGATE, MUST NOT EXCEED 15% OF THE DISTANCE BETWEEN OUTER AND INNER EDGES OF THE FAYING SURFACES. ALTERNATE METHOD: INDUCTION BRAZE PER 2850905.

3 SURFACE TREATMENT: PASSIVATE PER QQ-P-35, TYPE I, II, OR III. PASSIVATE ALL SST COMPONENTS PRIOR TO BRAZING.

4 MARK "53711-5942132-1" IN APPROX LOCATION SHOWN PER MIL-STD-130.

5 PRIOR TO BRAZING TO VALVE (ITEM 1), REMOVE VALVE PLUG ASSEMBLY FROM VALVE BODY IN ACCORDANCE WITH VALVE MANUFACTURER'S RECOMMENDATIONS. DURING BRAZING, PROTECT BODY BORE AND THREADED HOLE FROM CONTAMINANTS. AFTER BRAZING, REASSEMBLE IN ACCORDANCE WITH VALVE MANUFACTURER'S RECOMMENDATIONS.

6. PRESSURE TEST AT 285 ± 10 PSIG, STABILIZE AND HOLD AT PRESSURE 15 MINUTES. NO LEAKS OR PRESSURE DROP PERMISSIBLE. CLEAN WITH DISTILLED WATER, DRY WITH INERT GAS OR NITROGEN. CAP ALL OPENINGS WITH REMOVABLE SEALS PRIOR TO SHIPMENT.

7 VALVE PLUG TO BE FLUSH TO .03 BELOW SURFACE OF VALVE, ITEM 1, VALVE PLUG TO BE .25 MIN THK

8. ALL FLUIDS OR GASES USED AFTER PASSIVATION SHALL BE FLUIDS WITH A RESISTIVITY OF GREATER THAN 500K OHMS OR INERT GASES WITH A DEW POINT OF -60° F OR LOWER.

9 PROTECT FROM SCRATCHES AND NICKS DURING INSPECTION AND HANDLING.

SEE SEPARATE P/L
PART NO. 5942132-1

28	29	30	31	32	33	34	35
20	21	22	23	24	25	26	27
12	13	14	15	16	17	18	19
4	5	6	7	8	9	10	11
REV STATUS OF SHEETS				REV	C		
				SH	1	2	3

IBM 6029940 MFG
IBM 2850905 BRAZE 2

SPECIFICATION NUMBER AND TYPE | NOTE | ITEM NO | APPLIES TO
APPLICABLE CONTRACTOR'S SPECIFICATIONS

IF "SOURCE CONTROL DRAWING" ONLY THE ITEM DESCRIBED ON THIS DRAWING WHEN PROCURED FROM THE VENDOR(S) LISTED HEREON IS APPROVED BY: NAVAL SEA SYSTEM COMMAND DEPT OF THE NAVY WASHINGTON, D.C. 20362
FOR USE IN THE APPLICATION(S) SPECIFIED HEREON. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TESTING AND APPROVAL BY NAVSEA OR IN
(GOVERNMENT PROCURING ACTIVITY)

UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART.
TOLERANCE ON: 1 PLACE DEC | 2 PLACE DEC | ANGLES
±.03 | ±.010 | ±1°
MATL [1]
FINISH | CAGE CODE
SURF TREAT [3]

CONTR NO. N00024-82-C-6222
DRAWN HAC/IBM 6/27/83
CHECKED HAC/IBM 6/27/83
PROJ ENGR HAC/IBM 6/27/83
DESIGNER HAC/IBM 6/27/83

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362

TITLE
MANIFOLD, LOWER

SIZE D | FSCM NO. 53711 | DWG NO. 5942132
SCALE 1/2 | WT 12.40 LB CALC | SHEET

DWG NO. 5942132 REV C

NAVAL WEAPONS SUPPORT CENTER

APPROVED	SUGGESTED SOURCE(S) OF SUPPLY		
VENDOR	VENDOR ADDRESS	FSCM NO.	VENDOR DRT. OR PI
CIRCLE SEALS CONTROLS	ANAHEIM CA 92801	91816	MV99-14

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
E	RETAINAN BY NAVSEC CRANE WITHOUT CHANGE	6/27/83	D. GEIGER
F	INCORPORATE MOR 5942143F	7/26/87	D. GEIGER

8. ALL FLUIDS OR GASES USED AFTER PASSIVATION SHALL BE FLUIDS WITH A RESISTIVITY OF GREATER THAN 500 K OHMS OR INERT GASES WITH A DEW POINT OF -60° F OR LOWER.

[9] ARROW INDICATES FLOW DIRECTION WHEN VALVE IS OPEN. VALVE TO BE CAPABLE OF SUPPORTING FLOW RATE OF 2.8 GPM THROUGH PORT IN DIRECTION SHOWN.

[10] PORTS SHOWN REPRESENT HIGH PRESSURE SIDE OF VALVE WHEN VALVE IS CLOSED.

[11] PORTS SHOWN REPRESENT LOW PRESSURE SIDE OF VALVE WHEN VALVE IS CLOSED.

12. IDENTIFICATION OF THE SUGGESTED SOURCE(S) OF SUPPLY HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEM(S).

NOTES:

[1] MATL:
BODY: SST TYPE 303 COND A PER ASTM A-582
PLUG: NITRONIC 60
O-RING: PER NAS 1613 (ETHYLENE PROPYLENE) WITH THE FOLLOWING EXCEPTIONS:

A. IDENTIFICATION. O-RINGS SHALL NOT BE MARKED WITH COLOR CODING.

B. COMPRESSION SET. COMPRESSION SET SHALL NOT EXCEED 15 PERCENT WHEN TESTED IN ACCORDANCE WITH COMPRESSION SET TEST OF ASTM D1414 AT TEST TEMPERATURE OF 250° ±4°F FOR 22 ±2 HOURS.

C. PACKAGING. PACKAGING REQUIREMENTS SHALL BE AS FOLLOWS:

O-RINGS SHALL BE INDIVIDUALLY PACKAGED IN ACCORDANCE WITH MIL-P-4861, LEVEL A. THEY SHALL BE THOROUGHLY CLEAN BEFORE PACKAGING. PACKAGING SHALL BE ACCOMPLISHED UNDER CONDITIONS WHICH WILL ASSURE FREEDOM FROM ALL CONTAMINATION OR DAMAGE TO THE RINGS. THE UNIT PACKAGE SHALL BE OF SUCH MATERIAL AND CONSTRUCTION AS TO PROTECT THE RING FROM CONTAMINATION UNTIL THE PACKAGE IS OPENED.

EACH PACKAGE SHALL BEAR THE FOLLOWING IDENTIFICATION IN PRINT OF A SIZE THAT CAN BE EASILY RECOGNIZED:

PACKING, PREFORMED (O-RING)

VALVE VENDOR'S PART NUMBER

NAS SPECIFICATION NAS1613 MODIFIED PER NAVY DRAWING 53711-5942143

CURE DATE (QUARTER AND YEAR)

D. CERTIFICATION. THE O-RING VENDOR SHALL PROVIDE CERTIFICATION SHOWING THE O-RINGS CONFORM TO NAS 1613 AS MODIFIED HEREIN.

RETAINING RING: SST TYPE 302 COND A PER FED SPEC QQ-S-766.

[2] SURFACE TREATMENT: (SST PARTS ONLY) PASSIVATE PER QQ-P-35 TYPE I, II OR III FOR SST TYPE 302 PARTS, TYPE IV FOR SST TYPE 303 PARTS.

3.

[4] MIL-S-7742 APPLIES.

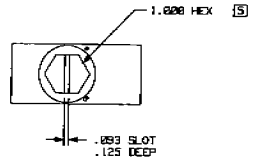
[5] VALVE SHOWN IN CLOSED POSITION. ROTATE PLUG 90° COUNTERCLOCKWISE FOR OPEN POSITION. VALVE TO HAVE POSITIVE STOPS IN FULLY OPENED AND FULLY CLOSED POSITIONS.

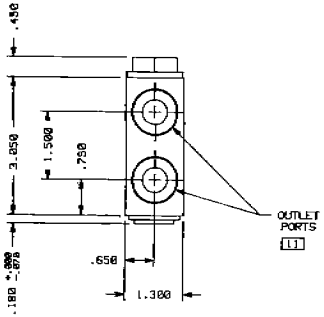
6. TECHNICAL DATA:
OPERATING PRESSURE: 205 PSIG
PROOF PRESSURE: 308 PSIG
BURST PRESSURE: OVER 500 PSIG
OPERATING TEMP: +40° TO +122° F
NON OPERATING TEMP: -80° TO +160° F
INTERNAL LEAKAGE: NO VISIBLE LEAKAGE AT OUTLET AFTER 2 MINUTES MIN WITH VALVE IN CLOSED POSITION AND 205 PSIG APPLIED PRESSURE.
EXTERNAL LEAKAGE: NONE
PRESSURE DROP: .5 PSID MAX
FLOW: 2.8 GPM (SEE NOTE 9)
FLUID: WATER PER MIL-W-21985
SUITABLE FOR: WATER
LUBRICANT: SEALS- PACK O-RING GROOVES AND LUBRICATE HOUSING BORE AND O-RINGS LIGHTLY WITH DRI-LUBE 822. THUS- DRI-LUBE 822
OPEN/CLOSE CYCLES: THE DESIGN OF THE VALVE SHALL BE TESTED TO VERIFY IT WILL MEET THE FOLLOWING OPEN/CLOSE CYCLE TESTS.

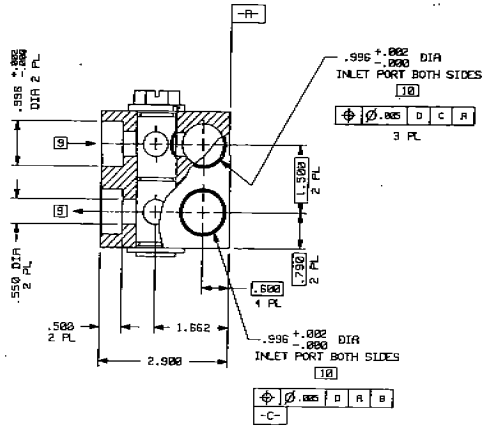
A. WITH VALVE IN CLOSED POSITION, APPLY 60 #5 PSIG WATER TO INLET PORTS. OUTLET PORTS ARE TO BE AT ATMOSPHERIC PRESSURE.
B. OPEN VALVE COMPLETELY AND CLOSE COMPLETELY.
C. PERFORM STEPS A AND B 50 TIMES.
D. VALVE SHALL MEET ALL OTHER REQUIREMENTS AFTER OPEN/CLOSE CYCLE TESTS.

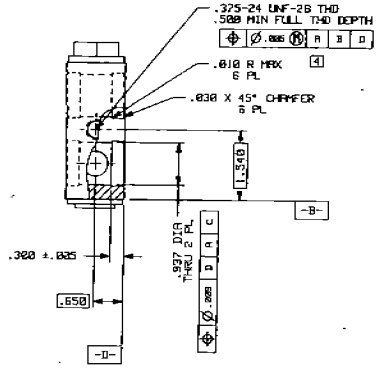
MAXIMUM TORQUE TO OPEN AND CLOSE VALVE: 40 IN-LBS WITH PRESSURES OF 0 AND 110 PSIG APPLIED TO INLET PORTS.

7. CLEAN WITH DISTILLED WATER. DRY WITH INERT GAS OR NITROGEN. CAP ALL OPENINGS WITH REMOVABLE SEALS PRIOR TO SHIPMENT.









SPECIFICATION CONTROL DRAWING

INTERPRET DRAWING PER DOD-STD-100

PART NO. 5942143-1

CONTR NO.	N00024-82-C-6222	DEPARTMENT OF THE NAVY	NAVAL SEA SYSTEMS COMMAND
PREPARED	6/27/83 HAC/IBM	TITLE	VALVE, SHUT-OFF
CHECKED	6/27/83 HAC/IBM		
PROJ ENGR	6/27/83 HAC/IBM	SIZE	E
ENGINEER	6/27/83 HAC/IBM	FSCM NO.	53711
		DWG NO.	5942143
		SCALE	1/1 WT 2.77 LB CALC SHEET

UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE TO APPLY TO THE FINISHED PART.
TOLERANCE ON: 1 PLACE DEC ± .03 | 2 PLACE DEC ± .010 | ANGLES ±1°
MATL [1]
HEAT TREAT
SURF TREAT [2]

IF "SOURCE CONTROL DRAWING" ONLY THE ITEM DESCRIBED ON THIS DRAWING WAS PROCURED FROM THE VENDOR(S) LISTED HEREIN OR REFERENCED IN: NAVAL SEA SYSTEMS COMMAND DEPT OF THE NAVY WASHINGTON, D.C. 20362
FOR USE IN THE ACQUISITION(S) SPECIFIED HEREIN. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TESTING AND APPROVAL BY AMMSEA OR SP

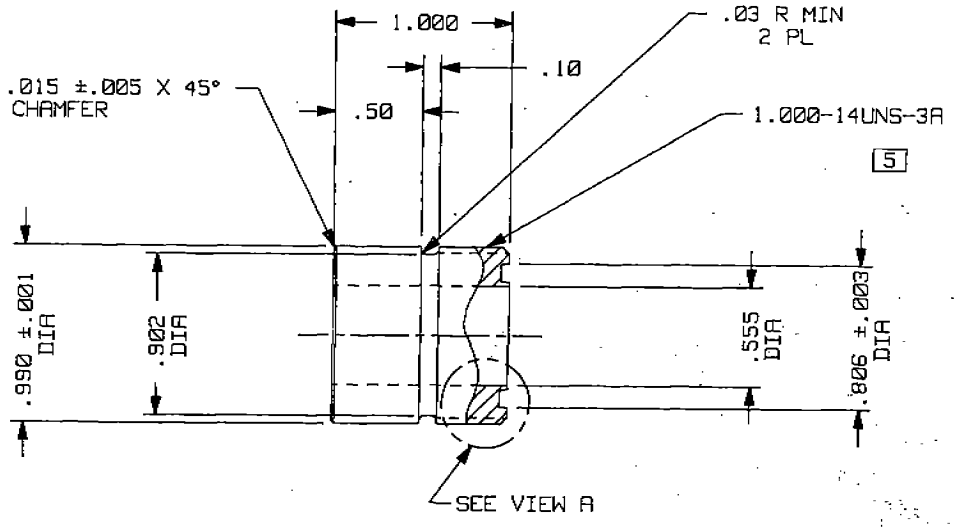
SPECIFICATION NUMBER AND TYPE | NOTE | ITEM NO
APPLICABLE CONTRACTOR'S SPECIFICATIONS | APPLIES TO

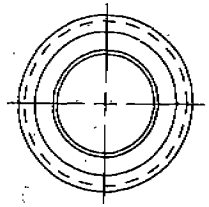
REV STATUS OF SHEETS | REV | F
SHT | 1 | 2 | 3

(DEPARTMENT PREPARING ACTIVITY)

APPROVED	SUGGESTED SOURCE(S) OF SUPPLY		
VENDOR	VENDOR ADDRESS	FSCM NO.	VENDOR CAT. OR PN

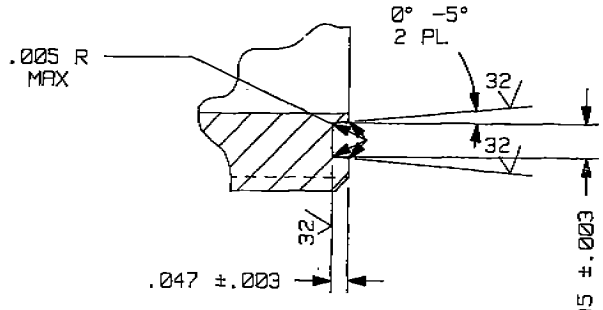
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
B	REDRAWN BY NWSC CRANE WITHOUT CHANGE	6/7/91	D. Fender





NOTES:

1. MAT'L: SST BAR TYPE 303 COND A PER ASTM A-582.
2. SURFACE FINISH TO BE 125 UNLESS OTHERWISE DESIGNATED.
3. SURFACE TREATMENT: PASSIVATE PER QQ-P-35, TYPE IV.
4. IDENTIFY PER MIL-STD-130. DO NOT MARK PART.
5. MIL-S-7742 APPLIES.



VIEW A
SCALE 4/1

PART NO. 5942144-1

28	29	30	31	32	33	34	35
20	21	22	23	24	25	26	27
12	13	14	15	16	17	18	19
4	5	6	7	8	9	10	11

REV STATUS OF SHEETS	REV			
	SH	1	2	3

IBM 6009940 MFG

SPECIFICATION NUMBER AND TYPE	NOTE	ITEM NO
	APPLIES TO	

APPLICABLE CONTRACTOR'S SPECIFICATIONS

IF "SOURCE CONTROL DRAWING" ONLY THE ITEM DESCRIBED ON THIS DRAWING WHEN PROCURED FROM THE VENDOR(S) LISTED HEREON IS APPROVED BY. NAVAL SEA SYSTEM COMMAND DEPT OF THE NAVY WASHINGTON, D.C. 20362

FOR USE IN THE APPLICATION(S) SPECIFIED HEREON. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR TESTING AND APPROVAL BY NAVSEA OR BY

(GOVERNMENT PROCURING ACTIVITY)

UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART.

TOLERANCE ON:		
2 PLACE DEC	3 PLACE DEC	ANGLES
± .03	± .010	± 1°

MATL 1

HRD | CASE DEPTH

SURF TREAT 3

CONTR NO.	N00024-82-C-6222
PREPARED	6/27/83 HAC/IBM
CHECKED	6/27/83 HAC/IBM
PROJ ENGR	6/27/83 HAC/IBM
ENGINEER	6/27/83 HAC/IBM

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362

TITLE
FITTING, HOSE

SIZE	FSCM NO.	DWG NO.
C	53711	5942144

SCALE 2/1 | WT .15 LB CALC | SHEET

DWG NO. 5942144 REV B SHEET

DWG NO. PL5942132 SH 1

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	REPLACED WITH CHANGE BY NWSC CRANE SEE NOR PL5942132C COVER SHEET ADDED	91/7/30	

12	13	14	15	16	17	18	19
4	5	6	7	8	9	10	11
REV STATUS OF SHEETS				REV	C	C	
				SH	1	2	3

SHARP CEEE
NEXT ASSY | USED ON
APPLICATION

NAVAL WEAPONS SUPPORT CENTER
CRANE, INDIANA 47522

INTERPRET DRAWING IN ACCORDANCE WITH DOD-STD-100

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±

MATERIAL

CONTR NO. N00024-82-C-6222

PREPARED HAC/IBM 6/27/83
CHECKED HAC/IBM 6/27/83
PROJ ENGR HAC/IBM 6/27/83
ENGINEER HAC/IBM 6/27/83

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362

MANIFOLD ASM, LOWER LEVEL

SIZE B | CAGE NO. 53711 | DWG NO. PL 5942132 | REV C
SCALE | SHEET 1 OF 2

PARTS LIST	DEPARTMENT OF THE NAVY NAVAL SEA SYSTEMS COMMAND WASHINGTON, D.C. 20362	CONTRACT NO. N00024-82-C-6222	FSCM 53711	**PL** 5942132	REVISION LTR C

LIST TITLE
MANIFOLD ASM, LOWER LEVEL

SHEET 2 OF 2

ITEM NO.	REFERENCE DESIGNATION	QUANTITY REQUIRED	UNIT MEAS	FSCM	DRAWING OR DOCUMENT NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SY	PL	CH
ITEMS COMMON TO PART NUMBER 5942132-1										
1		3	01			5942143-1	VALVE, DRAWER SHUTOFF	V		D
2		6	01			5942144-1	FITTING	V		D
3							NOT USED			

UNIT OF MEASURE CODE
01 = PIECE EACH
11 = INCH
12 = FEET
18 = CUBIC FOOT
21 = METER
28 = MILLIMETER
31 = OUNCE (AVDP)
35 = OUNCE (TROY)
41 = GRAM
44 = CUBIC CENTIMETER
59 = FLUID OUNCE
86 = CUBIC INCH

SYMBOL CODE (SY): FOR GOVERNMENT STANDARD ITEMS: E = ELECTROSTATIC SENSITIVE. H = HEAT SENSITIVE. S = SOLVENT SENSITIVE OR. M = MULTISENSITIVE
FOR OTHER ITEMS: V,E,H,S or M = VENDOR ITEM-SEE IBM CONTROL DRAWING E,H,S or M ALSO INDICATES THESE ITEMS ARE PROCESS SENSITIVE AS INDICATED ABOVE FOR "GOVERNMENT STANDARD ITEMS."

PLANNING CODE (PL): K = ALTERNATE ITEM P = BULK MATL (ALL OTHER PL CODES ARE FOR IBM REF ONLY; EG. G = GOVT FURN ITEM J = AS REQD
L = DO NOT FILL N = VENDOR FURN R = REF X = DO NOT GENERATE Z = DUMMY CONNECT)

CHARACTER CODE (CH): A = WITH BILL OF MATL D = WITHOUT BILL OF MATL R = FACTORY REF

DWG NO. 6009940

REVISIONS

CHK	ENGRG NOTICE	LTR	DESCRIPTION	DATE	APPROVED
	66171F	B	RETYPED WITH CHANGE	12/28/66	—
WHT	66207P	B	SEE AMENDMENT NO. 1	5/31/68	R.W. SPENCER
JR	66134VN	C	REVISED PARA 3.8	4/18/77	M.B. BROWN
	66999FJ	D	REVISED PARA 2.1, 3.1, 3.2, 3.3	1/14/83	C.A. BARNHILL
	66422B	E	ADDED REPAIR SECTION PARA. 7	84-10-30	
	66445RK	F	DELETED REPAIR SECTION, PAR. 7	7/31/86	

CONTR NO. AF34(601)26026
PREPARATION D.E. Campbell 9/22/66
DSN CHK R.N. Held 10/20/66
DWG CHK W.H. Thomas 12-8-66
DSGN APPROVAL R.W. Mace 10-20-66

INTERNATIONAL BUSINESS MACHINES CORP.
FEDERAL SYSTEMS DIVISION
OWEGO, N.Y.

TITLE
STANDARD MANUFACTURING LIMITS

SIZE	CODE IDENT NO.	DWG NO.
A	03640	6009940

SCALE	WT	SHEET
		1 of 19

DILVIE PRESS, INC., BROOKLYN, N. Y. 11217 STOCK NO. N9501 7-68

600994C F

STANDARD MANUFACTURING LIMITS

1. SCOPE. This specification establishes the standard manufacturing limits for fabricated parts when the limits are not specified on the drawing. The requirements of this specification apply to all IBM (FSD-ESC) designed parts fabricated internally or for IBM by a vendor, supplier or subcontractor.

1.1 EXCEPTIONS. Exceptions to the requirements of this specification are listed below:

a. When requirements specified on a drawing conflict with requirements of this specification, the requirements on the drawing shall take precedence.

b. Unless otherwise specified on the drawing, non-machined surfaces of castings, moldings, forgings, etc. are not required to adhere to the requirements of this specification.

2. APPLICABLE DOCUMENTS

2.1 The following specifications, standards, and publications of the issue in effect on date of invitation for bids, unless otherwise specified, form a part of this specification to the extent specified herein. In case of conflict between an engineering drawing, this specification, and documents referenced herein, the following order of precedence shall apply:

a. The Engineering Drawing

b. This Specification

c. The Documents referenced herein

AF 34(601)26026

6009940F

SPECIFICATIONS

Military

MIL-W-6858	Welding, Resistance: Aluminum, Magnesium, Non-Hardening Steels or Alloys, Nickel Alloys, Heat-Resisting Alloys, and Titanium Alloys; Spot and Seam
MIL-W-6873	Welding: Flash; Carbon and Alloy Steels
MIL-W-8604	Welding of Aluminum Alloys: Process for
MIL-W-8611	Welding, Metal Arc and Gas, Steels, and Corrosion and Heat Resistant Alloys; Process for
MIL-W-18326	Welding of Magnesium Alloys, Gas and Arc, Manual and Machine Process for

Industry

AMS-2665	Silver Brazing
AMS-2670	Copper Furnace Brazing-Carbon and Low Alloy Steels
AMS-2671	Cooper Furnace Brazing-Corrosion and Heat Resistant Steels and Alloys
AMS-2672	Aluminum Brazing
ANSI-B46.1	Surface Texture
ANSI-Y14.5	Dimensioning and Tolerancing

IBM

6009424	Brazing, Aluminum Molten Flux

6009940F

3. REQUIREMENTS

3.1 DIMENSIONING. Dimensioning on drawings shall be in accordance with the requirements of ANSI Y14.5

3.2 TOLERANCING. Tolerancing on drawings shall be in accordance with the requirements of ANSI Y14.5

3.3 SURFACE TEXTURE. Unless otherwise specified, surface texture of the surfaces of solid non-plastic materials depicted on drawings shall be 125 or better in accordance with the requirements of ANSI-B-46.1. (See 3.3.1 for plastics.)

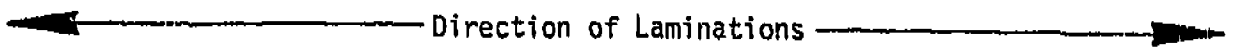
3.3.1 Surface Quality of Plastics. When surface quality is desired for the appearance or function of a plastic part, one of the following symbols shall be used on the drawing to indicate the degree of roughness permissible on the finished part. Surface quality of plastics shall be subject to visual comparison or visual inspection only.

1. 32 (Molded surface free from flash but in which fine tool or mold marks may be visible.)

2. 16 (Machined surface in which fine tool marks may be visible.)

3. 8 (Machined or molded surface in which tool or mold marks are not visible.)

3.4 DIRECTION OF LAMINATIONS. The terms (DIRECTION OF LAMINATIONS) or (DIRECTION OF GRAIN) are synonymous. The direction of laminations shall be interpreted as being parallel to the length or width of the laminated sheet as it is produced. If the direction of lamination is important to the appearance or function of a plastic part, the following notation shall be added to the drawing.



SIZE	CODE IDENT NO.	DWG NO.
A	03640	6009940
SCALE	REV E	SHEET 4

AF 34(601)26026

460H

6009940F

3.5 WELDING. Unless otherwise specified on the drawing, welding shall be done in accordance with the requirements of the following documents.

3.5.1 Flash Welding. Flash welding of carbon and alloy steel shall be in accordance with the requirements of MIL-W-6873.

3.5.2 Shielded Arc Welding. Shielded arc welding of aluminum and aluminum alloys shall be in accordance with the requirements of MIL-W-8604.

3.5.3 Metal Arc and Gas Welding. Metal arc and gas welding of steel and corrosion and heat resistant steel alloys shall be in accordance with the requirements of MIL-W-8611.

3.5.4 Spot and Seam Welding. Spot and seam welding of aluminum, magnesium, titanium and non-hardening steels or alloys shall be in accordance with the requirements of MIL-W-6858.

3.5.5 Inert Gas Metal Arc Welding. Inert gas metal arc welding of magnesium and magnesium alloys shall be in accordance with the requirements of MIL-W-18326.

3.6 BRAZING. Unless otherwise specified on the drawing, brazing shall be done in accordance with the requirements of the following documents.

3.6.1 Silver Brazing. Silver brazing shall be done in accordance with the requirements of AMS 2665.

3.6.2 Copper Furnace Brazing. Copper furnace brazing of carbon and low alloy steels shall be in accordance with the requirements of AMS 2670.

3.6.3 Aluminum Brazing. Aluminum brazing shall be done in accordance with the requirements of AMS 2672.

3.6.4 Copper Furnace Brazing. Copper furnace brazing of corrosion and heat resistant steels and alloys shall be in accordance with the requirements of AMS 2671.

3.6.5 Aluminum Molten Flux Brazing. Aluminum molten flux brazing shall be in accordance with the requirements of IBM Specification 6009424.

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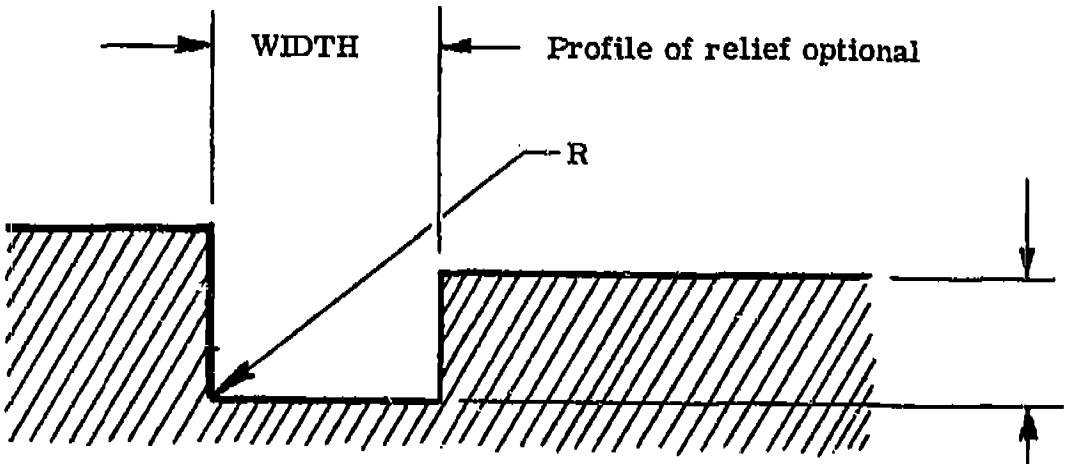
3.7 RELIEFS ON DIAMETERS. Unless otherwise specified on the drawing, a machining relief on diameters for manufacturing purposes is permissible on inside edges of parts. The primary function of a relief is to provide clearance in machining operations. A relief is not essential to the function of the part, therefore, it is not required to show or dimension a relief on a drawing. A relief is not permissible if a Min-Max radius or break is specified for the feature, or if a note, NO RELIEF, is added to the drawing.

3.7.1 Types of Reliefs. Figures 1 and 2 show the types of reliefs permissible. Figure 1 should be used when only the diameter is to be machined to a close tolerance. Figure 2 should be used when both the diameter and the face are to be machined to a close tolerance. The values shown in Figures 1 and 2 are the values that will be on the finished part.



Finished Dia.	Up to .125	Over .125 to .250	Over .250 to .650	Over .650 to 1.000	Over 1.000
Relief Depth(max)	.003	.006	.010	.015	.030
Relief Width(max)	.015	.015	.031	.031	.047

Heat treated parts should have a .010 minimum radius to eliminate stress concentration.

FIGURE 1

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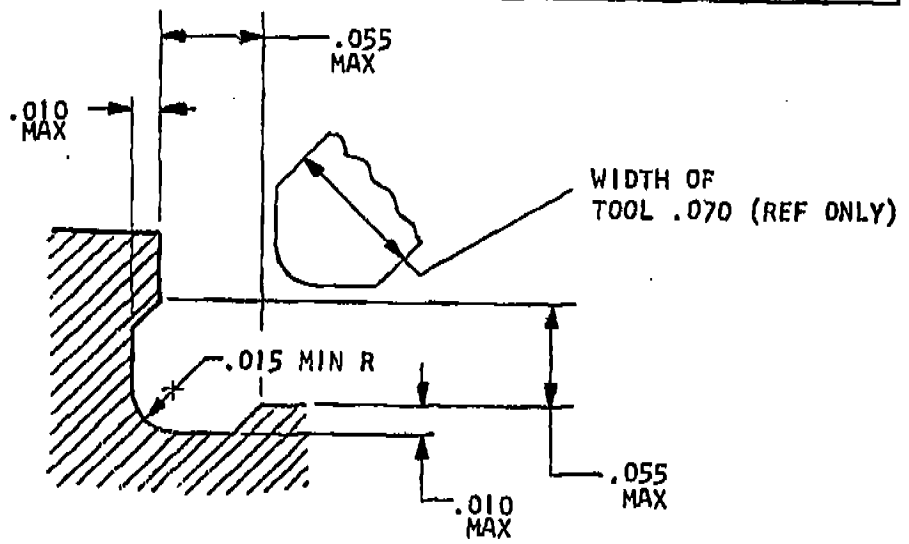

FIGURE 2

3.7.2 RELIEF RADII. THE INSIDE EDGES OF A RELIEF RADII MAY BE ROUNDED WITH A RADII AS LARGE AS IS PERMISSIBLE.

3.8 EDGE AND CORNER CONDITIONS.

3.8.1 EDGE AND CORNER BREAKS. IF A SPECIFIC EDGE OR CORNER BREAK IS NOT SHOWN ON THE DRAWING, THE FOLLOWING LIMITS APPLY TO ALL EDGES AND CORNERS.

OUTSIDE EDGES AND/OR CORNERS MAY BE BROKEN TO A MAXIMUM OF .020.

INSIDE EDGES AND/OR CORNERS MAY BE BROKEN TO A MAXIMUM OF .010.

(A BROKEN EDGE OR CORNER MAY BE ROUNDED, BUT NOT NECESSARILY ON A TRUE RADIUS. IT MAY BE PRODUCED BY A CUTTING TOOL, FILE, SCRAPER, OR ABRASIVE.)

3.8.2 BURRS. ALL PARTS SHALL BE FREE FROM BURRS AND CONDITIONED FOR SAFE HANDLING. SEE FIGURE 3 AND REFERENCE 6.1F, BURR DEFINITION.

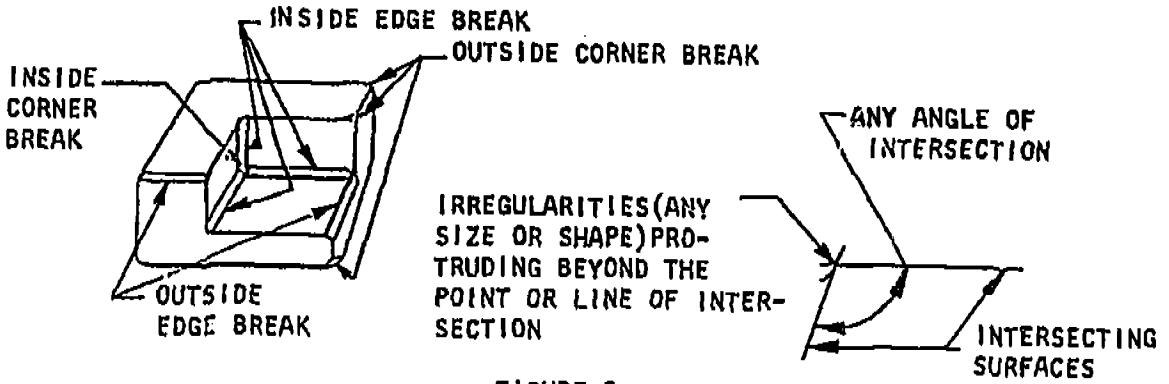

FIGURE 3

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3.9 HOLE ALIGNMENT. The alignment of machined holes that have a common axis or that are shown on a common center-line (see Figure 4 and 4A) shall be within the sum of the tolerances on the diameters of the two holes that have the smallest tolerances or shall be within the location tolerance of the holes whichever is smaller.

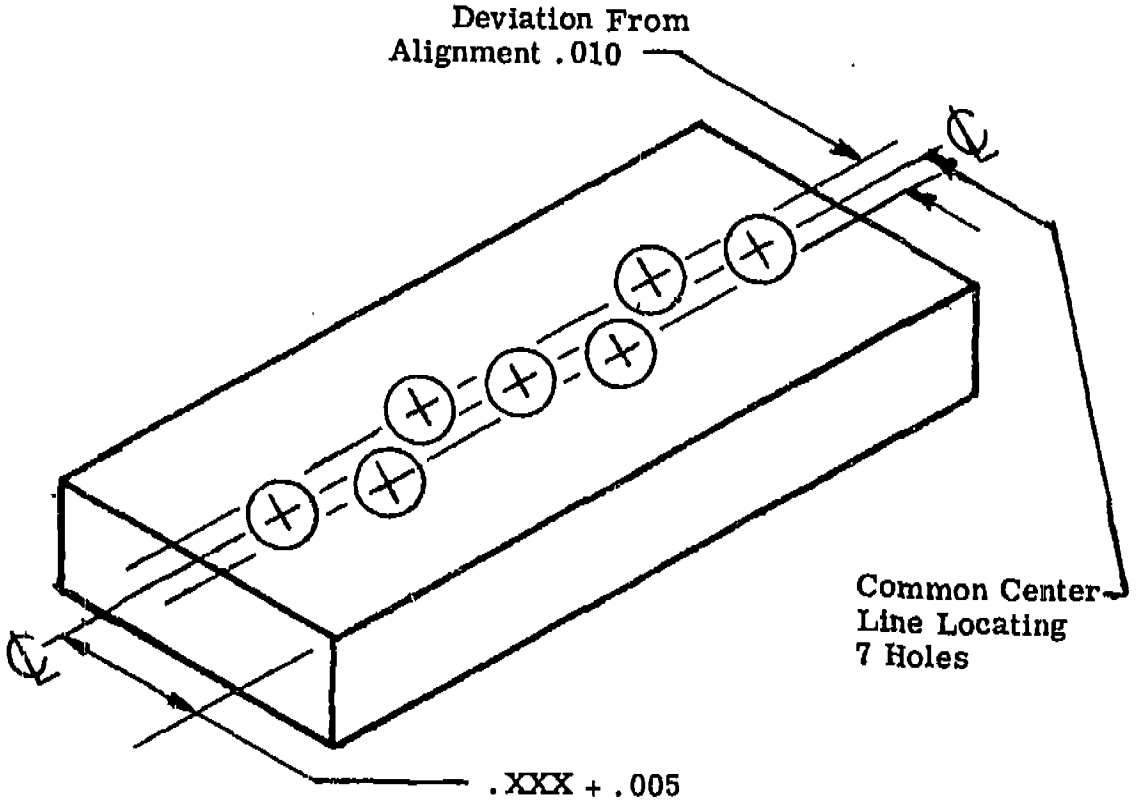

FIGURE 4

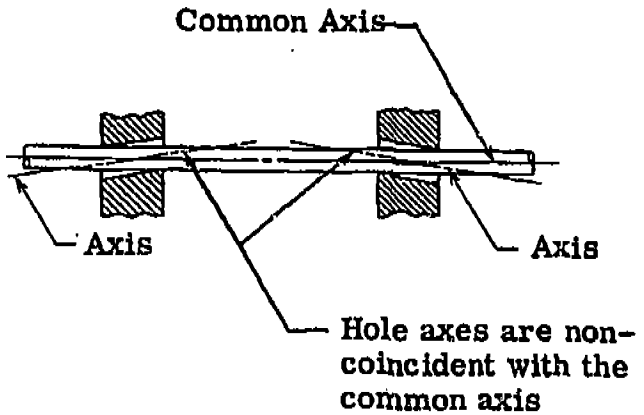

FIGURE 4A

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3.9.1 Machined Surfaces Alignment. The alignment of two or more flat machined surfaces of the same part that are in the same plane (see Figure 4B) shall be within the tolerance on the dimension that locates the surface. Where there is more than one dimension taken from the given surface, the smallest tolerance will apply. Total misalignment, however, shall not exceed .0005 per linear inch for functional surfaces or .001 per linear inch for non-functional surfaces.

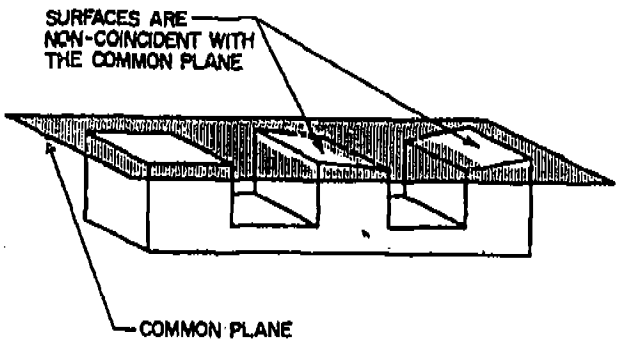

FIGURE 4B

3.10 CONCENTRICITY. Concentricity is a condition in which two or more features (such as cylinders, cones, and spheres) in any combination have a common axes. (See Figure 6.) Concentricity and eccentricity are NOT synonymous. Concentricity is actually the relative indication of position, each to each other, of two or more cylindrical surfaces for which common extended axes is intended.

3.10.1 True Concentricity. True concentricity exists between two or more closely related cylindrical surfaces when there is no indicated radial runout on any of these surfaces as each is rotated about the axis of the other.

3.10.2 Concentricity Measurement. The measure of concentricity of machined surfaces shall be the total indicator reading (TIR) which shall not exceed one-half of the sum of the tolerances on the diameters of those surfaces.

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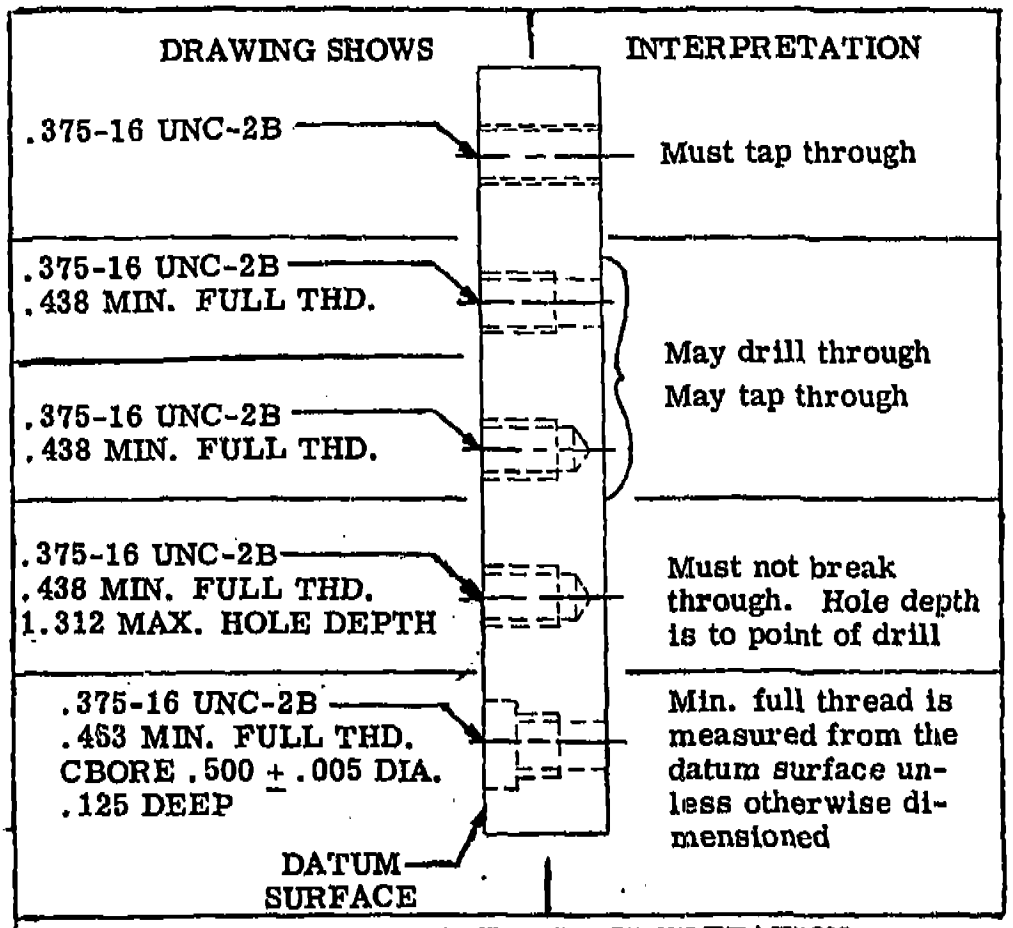
3.11 INTERNAL THREAD. Amount of internal thread is controlled by the note "_____ MIN FULL THD". The specified "min full thd" length must contain full form threads, or specified clearance for threads (e.g. countersinks); any partial threads or unthreaded hole length being outside the coverage of the dimension. The "min full thd" length is measured from the datum surface of the hole, including counterbores, countersinks, etc. (see Figure 5).

3.11.1 Depth of Tap Drill Hole is not specified on the drawing unless breakthrough is functionally unacceptable, in which case it is controlled by the note "_____ MAX HOLE DEPTH". This length includes the point of the drill. When not limited on the drawing, Manufacturing may drill through if they desire to avoid plating-acid entrapment, ease chip disposal and cutting fluid flow, etc. (See Figure 5).



DRAWING INTERPRETATION

FIGURE 5

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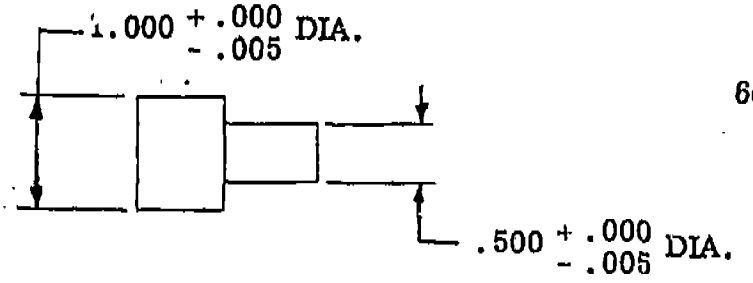

INTERPRETATION

One half the sum of the tolerances is .005 and is used to check concentricity. Either diameter can be used as the Datum

FIGURE 6

3.12 FLATNESS OF MACHINED SURFACES. The flatness of a machined surface (see Figure 7) one linear inch or greater shall be within the tolerance on the dimension that locates the surface. Where there is more than one dimension taken from the given surface, the smallest tolerance will apply The variation from true flatness, however, shall not exceed .0005 per linear inch for functional surfaces or .001 per linear inch for non-functional surfaces.

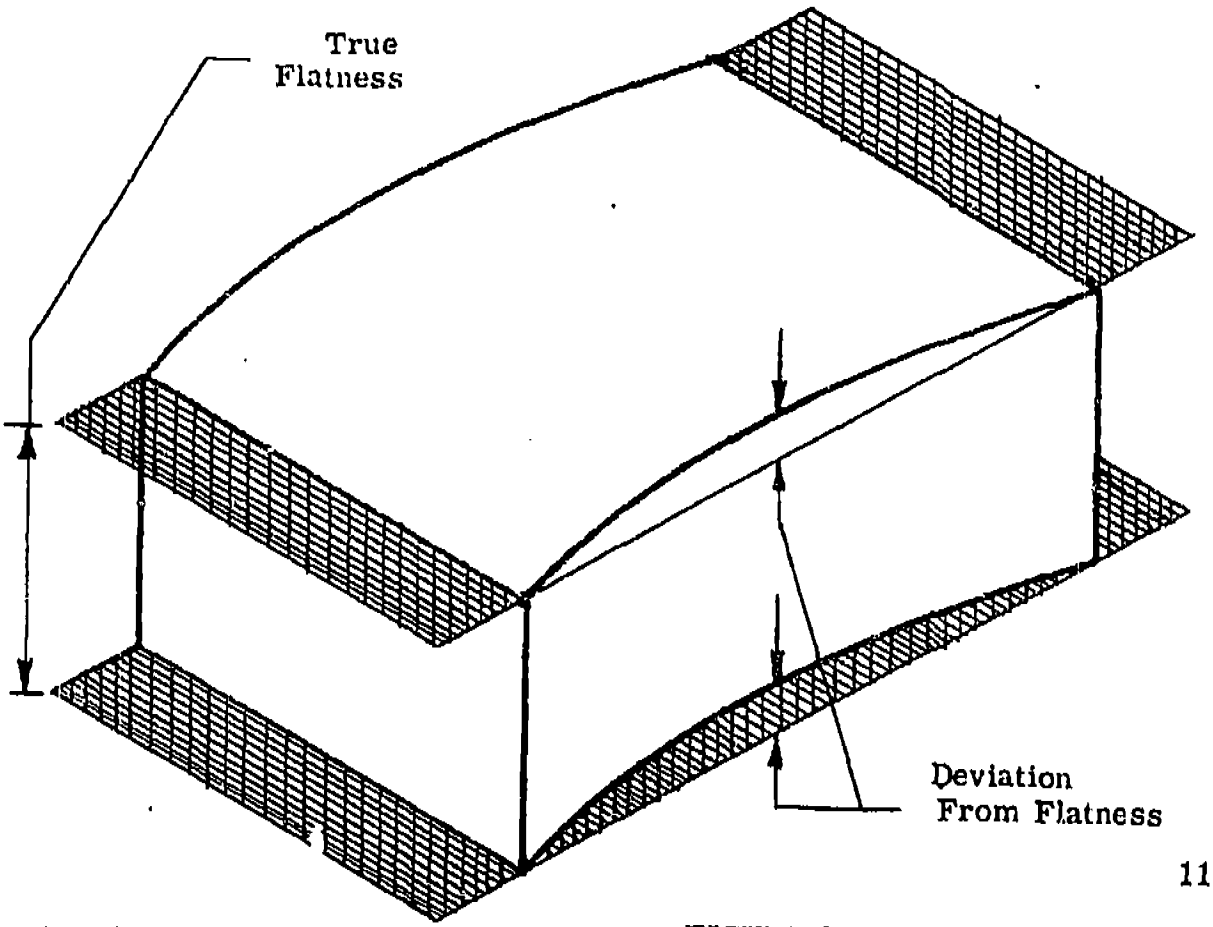

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FIGURE 7

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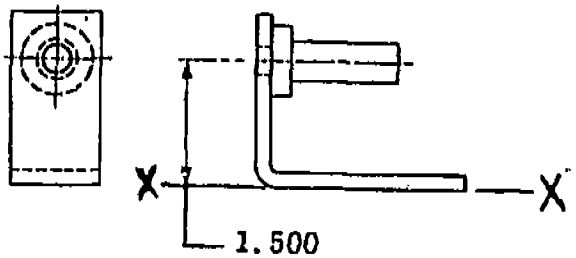
3.12.1 Flatness Less Than Linear Inch. The flatness of a machined surface less than one linear inch shall be within the tolerance on the dimension that locates the surfaces or within .0005 for functional surfaces or .001 for non-functional surfaces, whichever is smaller.

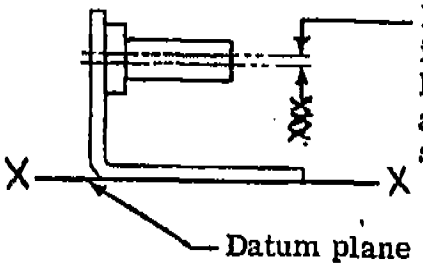
3.13 PARALLELISM OF MACHINED SURFACES. The parallelism of machined surfaces (see Figure 8) one linear inch or greater shall be within one-half of the tolerance on the dimension between those surfaces. Such variation from true parallelism shall not exceed .0005 per linear inch for functional surfaces or .001 per linear inch for non-functional surfaces.

DRAWING SHOWS



NOTES
1. Parallel to X-X within .XXX

INTERPRETATION



Full length of axis must lie in the tolerance zone established by two planes .XXX apart, parallel (equally spaced) to the datum plane

Datum plane established by the high points on datum surface

FIGURE 8

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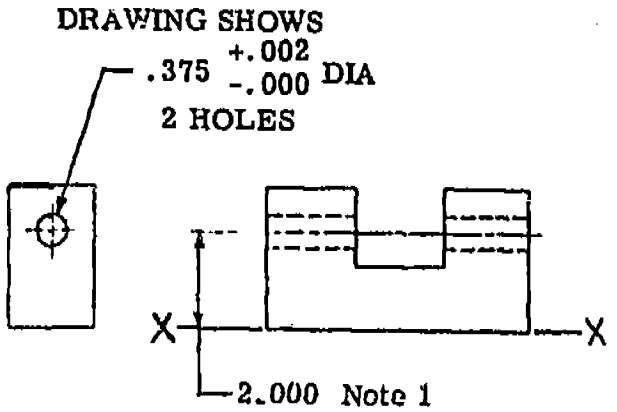
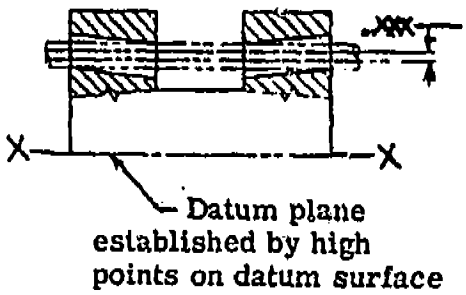
3.13.1 Parallelism Less Than Linear Inch. The parallelism of machined surfaces less than one linear inch shall be within one half of the tolerance of the dimension between the surfaces or within .0005 for functional surfaces or .001 for non-functional surfaces, whichever is smaller.

3.13.2 Parallelism of Machined Holes. Parallelism of the true axis of machined holes (see Figure 9) shall be within one-half of the tolerance on the dimension that locates the hole. Such variation from true parallelism shall not exceed .0005 per linear inch for functional surfaces or .001 per linear inch for non-functional surfaces.



NOTES
1 Parallel to X-X within .XXX

INTERPRETATION



Axis of aligning shaft must lie in this tolerance zone established by two planes .XXX apart, parallel(equally spaced) to the datum plane.

FIGURE 9

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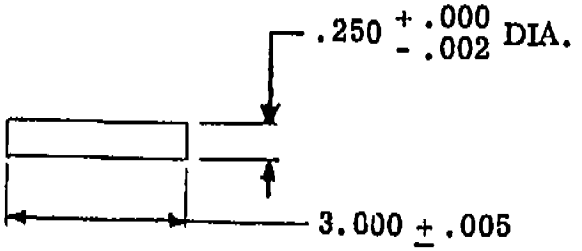
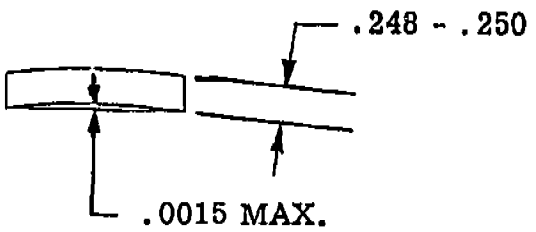
3.14 STRAIGHTNESS OF MACHINED CYLINDRICAL SURFACES. The straightness of machined cylindrical surfaces (see Figure 10) shall be within the tolerance on the diameter or .0005 per linear inch whichever is smaller.

DRAWING SHOWS



INTERPRETATION



The straightness tolerance is independent of the point-to-point max-min limits.

FIGURE 10

3.15 SQUARENESS OF MACHINED SURFACES. The squareness of machined surfaces (see Figure 11) and/or machined hole axis located at 90° from each other shall be within the tolerance of the dimension that locates the surface or hole. When there is more than one dimension locating the surface or hole, the smallest tolerance shall apply. Such variation from 90° shall not exceed .001 per linear inch.

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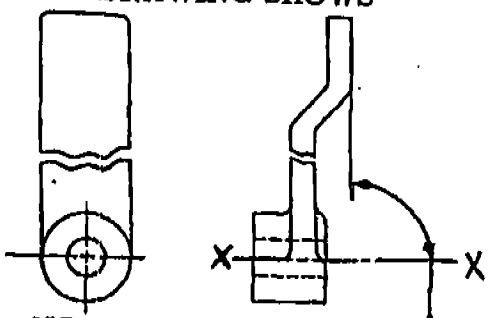
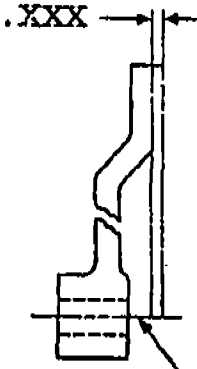
DRAWING SHOWS



NOTES
1. Square to X-X within .XXX

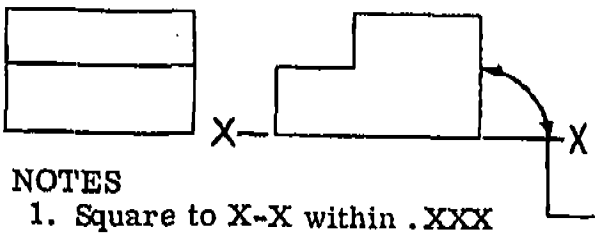
INTERPRETATION



Full area of the surface must lie in this tolerance zone established by two planes .XXX apart, perpendicular to the datum axis in all directions about the axis.

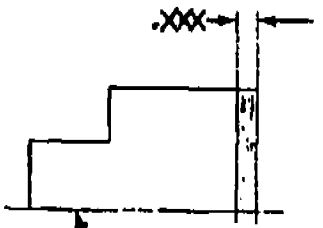
Datum axis established by datum hole

DRAWING SHOWS



NOTES
1. Square to X-X within .XXX

INTERPRETATION



Full area of surface must lie in this tolerance zone established by two planes .XXX apart, perpendicular to datum plane.

Datum plane established by the high points on datum surface

FIGURE 11

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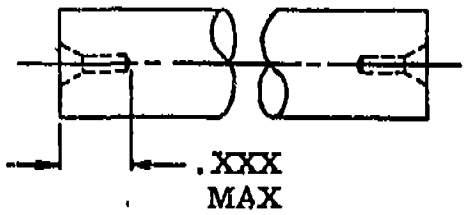
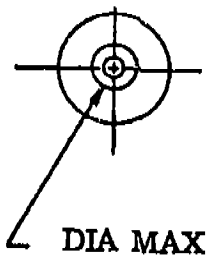
3.15.1 Squareness of Holes. The axial squareness of tapped or drilled holes located at 90° from a machined surface shall not exceed .005 per linear inch.

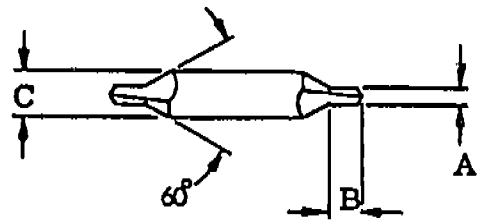
3.16 CENTERS ON CYLINDRICAL PARTS. (See Figure 12.) Centers are not usually shown on drawings. However, unless otherwise specified, only female centers are permissible on finished parts. The use of protective centers are permissible.



LIMITED DEPTH



LIMITED DIAMETER



CENTER DRILLS

Dimensions of Center Drills

SIZE	DRILL DIA (A)	DRILL LG (B)	BODY DIA (C)
00	.025	.047	.078
0	.031	.062	.125
1	.047	.047	.125
2	.078	.078	.188
3	.109	.109	.250
4	125	.125	.312
5	.188	.188	.438
6	.219	.219	.500
7	.250	.250	.625
8	.312	.312	.750

FIGURE 12

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3.17 ECCENTRICITY. (See Figure 13) Eccentricity is that condition which exists when two or more closely related, parallel axes are non-coincident. The amount of eccentricity is the distance between the location of these axes.

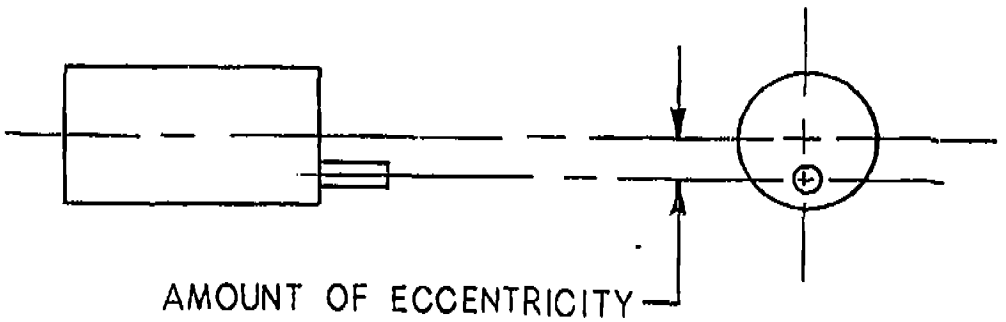

FIGURE 13

4. QUALITY ASSURANCE PROVISION.

4.1 QUALITY CONTROL. When requirements of this specification are referenced on the drawing all vendors, suppliers, contractors and subcontractors shall maintain adequate quality control to ascertain that all processes are applied in strict accordance with the applicable specifications, and meet all requirements of the specification.

4.1.1 Deviation and Substitution. All vendors, suppliers, contractors, and subcontractors shall not deviate from the requirements of a drawing, specifications, or this publication, nor shall they make substitutions in the type, grade, or quality of material, or finish without written approval or through IBM approved Quality Control procedures.

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4.1.2 Process Control. Unless otherwise specified in writing, all processes used, such as welding, heat treating, etc., shall have Government approval and certification for the class of work being handled. Manual fusion welding shall be performed by certified welders only.

4.1.3 Contractor Responsibility. All necessary specifications will normally be supplied with the contract or purchase order. However, should these specifications fail to accompany the contract or purchase order, it shall be the responsibility of the contractor to request and obtain such specifications from IBM before starting work. In the event that a question arises concerning which revision level of specification is to be considered binding, it shall be the responsibility of the contractor to request and obtain clarification from IBM.

5. PREPARATION FOR DELIVERY - Not Applicable

6. NOTES

6.1 DEFINITIONS

a. Tolerance - The difference between the allowable high limit and low limit of a given dimension.

b. Machined Surface - Any surface from which material has been removed by cutting tools controlled to produce a specified size, shape and finish. Sheet stock faces, molded and cast surfaces are not machined surfaces.

c. Functional Surface - Any machined surface or hole which locates or provides a dimensional reference.

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6.1 DEFINITIONS (continued)

d. Non-Functional Surface - Any machined surface or hole which does not locate or provide a dimensional reference.

e. Feature Relationships - Unless otherwise specified there is no required relation between the position of hub slots.

f. Burrs - Burrs are protruding irregularities of any size or shape. These irregularities protrude from the edges and corners in any direction beyond the line of intersection.

IBM FORM NO. 852-5200-B

REVISIONS

CHK	ENGRG NOTICE	LTR	DESCRIPTION	DATE	APPROVED
	98922SR	—	Release Re	2-29-4	C. E. Wirsing

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4	5	6	7	8
REV	—	—	—	
SH	1	2	3	

REV STATUS OF SHEETS (DO NOT USE ON SPECIFICATIONS)

CONTR NO. N00024-83-6083

PREPARATION

DSGN CHK 2/13/84

DWG CHK 2/13/84

DSGN APPROVAL 2/15/84 W S Green for MJR

OTHER APPROVAL (SPECIFY ACTIVITY)

IBM FEDERAL SYSTEMS DIVISION
☐ GAITHERSBURG, MD ☐ OWEGO, N Y
☐ HUNTSVILLE, AL ☒ MANASSAS, VA

TITLE
INDUCTION BRAZED STAINLESS STEEL ASSEMBLIES - REQUIREMENTS FOR

SIZE	CODE IDENT NO.	DWG NO.
A	52088	2850905

SCALE	WT	SHEET 1 OF 6

460H

1.0 Scope

1.1 This specification covers the general requirements for induction brazing of stainless steel.

2.0 Applicable Specifications

2.1 The following documents, of the current issue in effect, shall form a part of this specification to the extent specified herein.

Specifications

Federal

QQ-P-35B	Passivation treatments for corrosion - resisting steels
QQ-S-763	Steel bars, wire, shapes, and forgings for corrosion - resistant steels
QQ-S-766	Steel plates, sheets, and strips bar corrosion - resistant steels
ASTM-A-269	Steel tubing for corrosion - resistant steels

Military

MIL-S-5002	Surface Treatments & Metallic Coatings for Surfaces of Weapons Systems
MIL-B-7883 (Type III)	Brazing of Steels, Copper, Copper Alloy, Nickel Alloys, Aluminum and Aluminum Alloys
MIL-T-8504	Tubing, Steel Corrosion Resistant 304 Aerospace Vehicle Hydraulic Systems Annealed, Seamless and Welded
MIL-T-8506	Tubing, Steel, Corrosion Resistant 304 Annealed Seamless and Welded
MIL-T-8808	Tubing, Steel, Corrosion Resistant (18-8) Stabilized Aircraft Hydraulic Quality
MIL-B-15935	Brazing Alloys, Silver
MIL-C-144550	Copper Plating (Electrodeposited)
MIL-STD-105	Sampling Procedures and Tables for Inspection
MIL-STD-453	Inspection, Radiographic

IBM

GIP-001 Quality Workmanship Manual

Commercial

AWS-A-5.8 Brazing Filler Metal

AMS 4777 Brazing Alloy, Nickel Base

3.0 Requirements

3.1 Induction Brazing Equipment

3.1.1 The induction brazing equipment shall be capable of developing a heat pattern at the faying surfaces that will flow the braze alloy from the point of placement to the outside edge of the braze joints making a suitable fillet along this edge.

3.1.2 This equipment shall have the necessary controls to make the process repeatable.

3.1.3 An atmosphere of argon or hydrogen or a combination of both with a dew point of minus seventy degrees Fahrenheit (-70°F) or lower and a purity of 99.95% or better shall surround the inside and outside of the stainless parts or subassemblies being brazed together.

3.1.4 Any hydrogen atmosphere shall be contained in a housing properly vented for a hydrogen explosion.

3.1.5 Suitable equipment shall be provided to purge all oxygen and water vapor from the brazing container so that the exit gas has a dew point of minus sixty degrees Fahrenheit (-60°F) or lower and is oxygen free. The result will be a bright and shiny stainless steel assembly free of oxides and scale.

3.2 Materials

3.2.1 Type 304 L, 316 L, 321 or 347 stainless steel and no other grades of stainless steel, seamless tubing shall be purchased in accordance with MIL-T-8504, MIL-T-8506, or MIL-T-8808.

3.2.2 Type 304 L, 316 L, 321, or 347 bar, sheet and plate and no other grades of stainless steel shall be purchased in accordance with QQ-S-763, QQ-S-766, and ASTM SPEC A-269.

3.2.3 Silver Braze wire or foil (BAg 19) or Nickel braze power (BNI-2 or AMS 4777) shall be procured in accordance with AWS-A-5.8 filler metal specification.

3.2.4 Bottled or bulk hydrogen or argon shall have a dew point of minus seventy degrees Fahrenheit (-70°F) or lower.

3.3 Cleaning

3.3.1 All stainless steel parts and/or subassemblies shall be passivated in accordance with QQ-P-35.

3.3.2 After passivation, all parts shall be handled with clean white, lint free, gloves until they are brazed.

3.4 Assembly

3.4.1 All parts shall be matched and fixtured so that the clearance between faying surfaces will be maintained between .001 and .003 inch.

3.4.2 The wire, foil, powder brazing alloy shall be placed at the coldest area of the heat pattern induced along the faying surfaces.

3.5 Brazing Cycle

3.5.1 The heat pattern induced and conducted into the faying surface must pull the braze alloy from the point of placement to the outside edge.

3.5.2 No flux is permitted in this operation; only the getting action of the lithium in BAg-19 is permissible.

3.6 Cool-Down

3.6.1 Parts when removed from the atmosphere of argon and/or hydrogen must be clean and free of scale and oxides.

4.0 Results Required

4.1 All parts shall attain 85% minimum coverage in the area contained between one inch along the outside and inside edge of the faying surface area. Also, any line drawn between the outside and inside area will be 85% brazed. The above may be interpreted by either fracture or X-ray of test coupons specified for the lot size in MIL-STD-105 necessary to attain 95% confidence that all parts are good pieces. Once, the control limits are established as data for acceptable machine settings; they do not have to re-established unless:

A. Parts of a previously brazed lot do not pass the visual test specified by MIL-B-7883.

B. The fracture of the first brazed part of a lot does not pass the peel test specified by Paragraph 4.2

C. The induction brazing tool requires a change outside the setting range required for control.

D. The parts of a previously brazed lot do pass the pressure test, when required by the drawing.

4.2 A peel test simulating the mass, material and configuration of first brazed joint per lot shall fracture 85% or more of the brazing alloy or parent metal. If it does not, the equipment must be reset until the heat pattern develops the desired fracture. If outside the established control limits, revert to paragraph 4.1.

4.3 All liquid containing assemblies must be pressurized to the requirements specified by the drawing for at least a five minute hold. No leaks or pressure drop during this period permitted.

4.4 Parts must pass the visual criteria specified by MIL-B-7883.

4.5 All parts must meet all dimensional requirements of the drawings.

4.6 If the number of defective pieces cumulated from visual, peel, and pressure exceeds the defective pieces permissible for the lot size in MIL-STD-105 to attain a 95% confidence, the entire lot is rejected and must be reworked. The next lot after the rejected lot has to be evaluated in accordance with paragraph 4.1.

5.0 Rework

5.1 All pieces of a rejected lot must be cycled 20 times in accordance with the pressure prescribed by the drawing and the duration specified by paragraph 4.3.

5.2 All defective pieces of a lot can be reworked once by reflowing with the parameter ranges prescribed for this part.

5.6 Any changes in gas pressure and flow, gas mixture and/or electrical parameters beyond the limits prescribed in paragraph 4.1 for the brazing of acceptable parts, will require new parameters be determined and documented (4.1).

5.7 Parts maybe reworked two additional cycles under the newly developed parameters.